

RESPONSE TO RESTRICTION REQUIREMENT

Serial No.: 10/714,580

Filed: November 14, 2003

Title: ANTIMICROBIAL ACTIVITY OF ANTIBODIES

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IN THE CLAIMS

Please amend the claims as follows:

1. (Original) An anti-microbial composition consisting essentially of an antibody that can bind to a microbe, and a pharmaceutically acceptable carrier, wherein the antibody can generate a reactive oxygen species when singlet oxygen ($^1\text{O}_2$) is present.
2. (Original) The anti-microbial composition of claim 1 that further consists of a sensitizer molecule that can generate singlet oxygen ($^1\text{O}_2$).
3. (Original) The anti-microbial composition of claim 2, wherein the sensitizer molecule is a pterin, a flavin, a hematoporphyrin, a tetrakis(4-sulfonatophenyl)porphyrin, a bipyridyl ruthenium(II) complex, a rose Bengal dye, a quinone, a rhodamine dye, a phthalocyanine, a hypocrellin, rubrocyenin, pinacyanol, allocyanin or a chlorin.
4. (Original) The anti-microbial composition of claim 2, wherein the sensitizer molecule is attached to the antibody.
5. (Original) The anti-microbial composition of claim 2, wherein the sensitizer molecule can generate a singlet oxygen when exposed to light.
6. (Original) The anti-microbial composition of claim 1, wherein the antibody is a human or a humanized antibody.
7. (Original) The anti-microbial composition of claim 1, wherein the antibody is a Fab, Fab', F(ab')₂, Fv or sFv fragment.
8. (Original) The anti-microbial composition of claim 1, wherein the reactive oxygen species is a superoxide radical, hydroxyl radical or hydrogen peroxide.

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9. (Original) The anti-microbial composition of claim 1, wherein the reactive oxygen species is ozone.
10. (Original) The anti-microbial composition of claim 1, wherein the microbe is a gram negative bacteria.
11. (Original) The anti-microbial composition of claim 1, wherein the microbe is *Aeromonas* spp., *Bacillus* spp., *Bacteroides* spp., *Campylobacter* spp., *Clostridium* spp., *Enterobacter* spp., *Enterococcus* spp., *Escherichia* spp., *Gastrospirillum* sp., *Helicobacter* spp., *Klebsiella* spp., *Salmonella* spp., *Shigella* spp., *Staphylococcus* spp., *Pseudomonas* spp., *Vibrio* spp., or *Yersinia* spp.
12. (Original) The anti-microbial composition of claim 1, wherein the microbe is associated with a staph infection, typhus, food poisoning, bascillary dysentery, pneumonia, cholera, an ulcer, diarrhea, hemorrhagic colitis, hemolytic uremic syndrome, or thrombotic thrombocytopenic purpura.
13. (Original) The anti-microbial composition of claim 1, wherein the microbe is *Staphylococcus aureus*, *Salmonella typhi*, *Salmonella typhimurium*, *Escherichia coli*, *Escherichia coli* O157:H7, *Shigella dysenteria*, *Psuedomonas aerugenosa*, *Pseudomonas cepacia*, *Vivrio cholerae*, *Helicobacter pylori*, a multiply-resistant strain of *Staphylococcus aureus*, a vancomycin-resistant strain of *Enterococcus faecium*, or a vancomycin-resistant strain of *Enterococcus faecalis*.
14. (Original) The anti-microbial composition of claim 1, wherein the microbe is *Escherichia* spp., *Pseudomonas* spp., or *Salmonella* spp.
15. (Original) The anti-microbial composition of claim 1, wherein the microbe is *Escherichia coli*, *Salmonella typhimurium*, or *Psuedomonas aerugenosa*.

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16. (Original) The anti-microbial composition of claim 1, wherein the microbe is a virus.
17. (Original) The anti-microbial composition of claim 16, wherein the virus is a DNA virus.
18. (Original) The anti-microbial composition of claim 16, wherein the virus is a RNA virus.
19. (Original) The anti-microbial composition of claim 16, wherein the virus is a viroid or a prion.
20. (Original) The anti-microbial composition of claim 16, wherein the virus is a hepatitis A virus, hepatitis B virus, hepatitis C virus, human immunodeficiency virus, poxvirus, herpes virus, adenovirus, papovavirus, parvovirus, reovirus, orbivirus, picornavirus, rotavirus, alphavirus, rubivirus, influenza virus type A, influenza virus type B, flavivirus, coronavirus, paramyxovirus, morbillivirus, pneumovirus, rhabdovirus, lyssavirus, orthomyxovirus, bunyavirus, phlebovirus, nairovirus, hepadnavirus, arenavirus, retrovirus, enterovirus, rhinovirus or filovirus.
21. (Original) A method of treating a microbial infection in a mammal comprising administering to the mammal an anti-microbial composition consisting essentially of an antibody that can bind to a microbe and a pharmaceutically acceptable carrier, wherein the antibody can generate a reactive oxygen species when singlet oxygen ($^1\text{O}_2$) is present.
22. (Original) The method of claim 21, wherein the composition further consists of a sensitizer molecule that can generate singlet oxygen ($^1\text{O}_2$).
23. (Original) The method of claim 22, wherein the sensitizer molecule is a pterin, a flavin, a hematoporphyrin, a tetrakis(4-sulfonatophenyl)porphyrin, a bipyridyl ruthenium(II)

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complex, a rose Bengal dye, a quinone, a rhodamine dye, a phthalocyanine, a hypocrellin, rubrocyenin, pinacyanol, allocyanin or a chlorin.

24. (Original) The method of claim 22, wherein the sensitizer molecule is attached to the antibody.
25. (Original) The method of claim 21, wherein the antibody is a human or a humanized antibody.
26. (Original) The method of claim 21, wherein the antibody is a Fab, Fab', F(ab')₂, Fv or sFv fragment.
27. (Original) The method of claim 21, wherein the reactive oxygen species is a superoxide radical, hydroxyl radical or hydrogen peroxide.
28. (Original) The method of claim 21, wherein the reactive oxygen species is ozone.
29. (Original) The method of claim 21, wherein the microbe is a gram negative bacteria.
30. (Original) The method of claim 21, wherein the microbe is *Aeromonas* spp., *Bacillus* spp., *Bacteroides* spp., *Campylobacter* spp., *Clostridium* spp., *Enterobacter* spp., *Enterococcus* spp., *Escherichia* spp., *Gastrospirillum* sp., *Helicobacter* spp., *Klebsiella* spp., *Salmonella* spp., *Shigella* spp., *Staphylococcus* spp., *Pseudomonas* spp., *Vibrio* spp., or *Yersinia* spp.
31. (Original) The method of claim 21, wherein the microbe is associated with a staph infection, typhus, food poisoning, bacillary dysentery, pneumonia, cholera, an ulcer, diarrhea, hemorrhagic colitis, hemolytic uremic syndrome, or thrombotic thrombocytopenic purpura.
32. (Original) The method of claim 21, wherein the microbe is *Staphylococcus aureus*,

Salmonella typhi, Salmonella typhimurium, Escherichia coli, Escherichia coli O157:H7, Shigella dysenteriae, Psuedomonas aerugenosa, Pseudomonas cepacia, Vivrio cholerae, Helicobacter pylori, a multiply-resistant strain of Staphylococcus aureus, a vancomycin-resistant strain of Enterococcus faecium, or a vancomycin-resistant strain of Enterococcus faecalis.

33. (Original) The method of claim 21, wherein the microbe is Escherichia spp., Pseudomonas spp., or Salmonella spp.

34. (Original) The method of claim 21, wherein the microbe is Escherichia coli, Salmonella typhimurium, or Psuedomonas aerugenosa.

35. (Original) The method of claim 21, wherein the microbe is a virus.

36. (Original) The method of claim 35, wherein the virus is a DNA virus.

37. (Original) The method of claim 35, wherein the virus is a RNA virus.

38. (Original) The method of claim 35, wherein the virus is a viroid or a prion.

39. (Original) The method of claim 35, wherein the virus is a hepatitis A virus, hepatitis B virus, hepatitis C virus, human immunodeficiency virus, poxvirus, herpes virus, adenovirus, papovavirus, parvovirus, reovirus, orbivirus, picornavirus, rotavirus, alphavirus, rubivirus, influenza virus type A, influenza virus type B, flavivirus, coronavirus, paramyxovirus, morbillivirus, pneumovirus, rhabdovirus, lyssavirus, orthmyxovirus, bunyavirus, phlebovirus, nairovirus, hepadnavirus, arenavirus, retrovirus, enterovirus, rhinovirus or filovirus.

40. (Currently Amended) A method of generating a reactive oxygen species to inhibit the growth of a microbe comprising contacting the microbe with (i) an antibody that can bind to the microbe and (ii) a source of singlet oxygen ($^1\text{O}_2$).

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41. (Original) The method of claim 40, wherein the source of singlet oxygen ($^1\text{O}_2$) is a sensitizer molecule.
42. (Original) The method of claim 41, wherein the sensitizer molecule is a pterin, a flavin, a hematoporphyrin, a tetrakis(4-sulfonatophenyl)porphyrin, a bipyridyl ruthenium(II) complex, a rose Bengal dye, a quinone, a rhodamine dye, a phthalocyanine, a hypocrellin, rubrocyanin, pinacyanol, allocyanin or a chlorin.
43. (Original) The method of claim 41, wherein the sensitizer molecule is attached to the antibody.
44. (Original) The method of claim 40, wherein the antibody is a human or a humanized antibody.
45. (Original) The method of claim 40, wherein the antibody is a Fab, Fab', F(ab')₂, Fv or sFv fragment.
46. (Original) The method of claim 40, wherein the reactive oxygen species is a superoxide radical, hydroxyl radical or hydrogen peroxide.
47. (Original) The method of claim 40, wherein the reactive oxygen species is ozone.